

**SECTION 711  
REINFORCING STEEL, STRUCTURAL STEEL  
HARDWARE, AND  
MISCELLANEOUS STRUCTURE ITEMS**

**711.01 REINFORCING STEEL.**

**711.01.1 Bar Reinforcing.** Furnish the specified reinforcing steel meeting AASHTO M 31 requirements.

The Project Manager may accept small lots of reinforcing steel subject to it passing the bending test specified in AASHTO M 31.

**711.01.2 Epoxy-Coated Reinforcing Bars.** Furnish epoxy-coated reinforcing bars meeting AASHTO M 284 and the Contract requirements.

**711.01.3 Wire and Wire Mesh.** Furnish concrete reinforcing wire meeting AASHTO M 32 requirements.

Furnish wire mesh reinforcing for concrete meeting AASHTO M 55 requirements and the Contract.

Furnish bar mats meeting AASHTO M 54 requirements.

**711.02 STRUCTURAL STEEL.** Furnish structural steel for:

- A. Bridge superstructure applications meeting AASHTO M 270/ M 270M for Temperature Zone 3;
- B. Other applications meeting AASHTO M 183/ M 183M.

**711.03 STRUCTURAL STEEL TUBING.** Furnish structural steel tubing for bridges meeting ASTM A 500, Grade B, requirements for cold-formed welded seamless carbon steel structural tubing in rounds and shapes.

**711.04 PINS AND ROLLERS.** Furnish pins and rollers of annealed carbon steel forging's meeting AASHTO M 102, Class C requirements, or cold-finished carbon steel shaft meeting AASHTO M 169 requirements, Grades 1018 to 1030 inclusive. Fabricate pins and recessed pin nuts as detailed in the AISC Manual of Steel Construction, current edition.

**711.05 WELDING ELECTRODES.** Use welding electrodes meeting AWS, AASHTO and the Contract requirements.

**711.06 HIGH TENSILE STRENGTH BOLTS.** Furnish heat-treated carbon steel bolt, nut, and washer material meeting AASHTO M 164 requirements.

Specify in the purchase order for galvanized high tensile strength bolts that copies of the manufacturer's inspection test reports for the materials be forwarded with the order. Make the reports available to the Project Manager upon request.

Rockwell C hardness cannot exceed 32 before galvanizing.

**711.07 BOLTS AND NUTS.** Furnish bolts, threaded rod, and nuts meeting ASTM A 307 Grade A requirements. Use hexagonal headed nuts for steel machine bolts and tap bolts.

**711.08 GALVANIZED METAL.** Furnish galvanized ferrous metal products meeting AASHTO M 111 requirements, or when applicable, meeting ASTM B 695 (Class 50) requirements.

**711.09 WELDED STUD SHEAR CONNECTORS.** Furnish shear connector studs meeting the AWS specification for "Stud Welding" and the Contract requirements.

**711.10 STEEL PILING.**

**711.10.1 Structural Steel Piles.** Furnish structural steel piles meeting ASTM A 36 and the Contract requirements. Bent or damaged piles will be rejected.

**711.10.2 Steel Pipe Piles.** Furnish new steel pipe piles meeting ASTM A 252, Grade 2 requirements. Steel pipe diameter and wall thickness is specified in the contract.

Use closure plates for closed-end piles meeting AASHTO M 183 requirements. The pipe, including end closures, must be capable of being driven by the specified methods without distortion. Closure plates and connecting welds must not project beyond the perimeter of the pile tips.

**711.11 PRESTRESSING STEEL.** Furnish prestressing steel meeting ASTM A 416 requirements.

**711.12 CASTINGS.**

**711.12.1 Steel Castings for Highway Bridges.** Furnish castings meeting AASHTO M 192, class 485 requirements.

**711.12.2 Chromium Alloy Steel Castings.** Furnish castings made from grade CA-15 meeting AASHTO M 163 requirements.

**711.12.3 Drainage Structure Castings.** Furnish structural drainage castings meeting the Detailed Drawing requirements and AASHTO M 306 requirements modified as follows:

1. References to Federal Specification RR-F-621C is changed to read RR-F-621 and current amendments thereto;
2. The Grey iron casting requirements of Subsection 3.1 are changed to AASHTO M 105 (ASTM A 48) Class 207;
3. The weight requirement of Subsection 4.2.4 is (plus or minus 5% Drawing/Specification Weight);
4. The proof load testing of Subsections 7.1 and 9.1.1 is 25,000 lbs. (110 kN);
5. Delete Subsections 11.1.2 and 11.1.3;
6. Subsection 11.1.4 is changed to read Heat number or date.

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**711.13 BEARING ASSEMBLY ANCHOR BOLTS FOR BRIDGES.** Furnish anchor bolts sized as specified and meeting ASTM A 36 requirements.

**711.14 ELASTOMERIC BEARING DEVICES.** Furnish elastomeric bearings meeting AASHTO M 251 and the Contract requirements.

**711.15 COMPRESSION JOINT SEALS.** Furnish preformed elastic joint seals meeting the open cell compression seal requirements of ASTM D 3542 and the Contract.

Furnish joint seals that accommodate the design movement specified in the contract and follow the manufacturers recommended installation width.

Use the seal manufacturer's recommended adhesive lubricant for seal installation. Use Lubricant meeting ASTM D 4070 requirements.

Provide the Project Manager a minimum 3 foot (915 mm) long seal sample taken from each size and type furnished on the project. Order the seals 3 feet (915 mm) longer than required for the installation. Furnish the Project Manager, two copies of the manufacturers certificate of compliance meeting Subsection 106.03, attesting that the material meets specifications.

Obtain the Project Manager's approval of all joint seals before installation.

Install the seals following the manufacturer's recommendations. Do not field splice seals.

Furnish and install the seals, including these costs in the bid price for structural steel.

**711.16 FIBER REINFORCED PADS.** Furnish pads made from new un-vulcanized rubber and synthetic fibers. Each component must make up 50% of the pads weight.

The pad surface must have:

1. A standard rubber hardness of 80 plus or minus 5 Shore A durometer;
2. An ultimate compressive breakdown strength of at least 7,000 psi (48.3 MPa);
3. A minimum and maximum pad thickness of 1/16-inch (2 mm) and 1/8-inch (3 mm), respectively.

Furnish the manufacturer's certification to the Project Manager that the pads meet these specifications. Assure a copy of the certification accompanies the shipment to the project. Pads not meeting these requirements will be rejected.

Fiber reinforced pads are incidental to and included in payment for other structural steel work.

**711.17 METAL BIN-TYPE RETAINING WALLS.** Furnish Metal bin-type retaining walls meeting the Contract requirements.

Furnish the necessary bolts and appurtenances for complete assembly of the members into a continuous closed-face wall of connected bins.

Assure the base metal and spelter coating meet AASHTO M 218 requirements.

Use galvanized bolts, nuts, washers, and other hardware meeting ASTM A 153 or B 695 (Class 50, Type I) requirements.

Assure all members are fabricated so units of the same nominal size are fully interchangeable. Do not drill, punch, or drift holes to correct defects in manufacture. Replace members having improperly punched holes at Contractor expense.

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Remove and replace damaged members or members with damaged or broken spelter at Contractor expense.

Meet the applicable treatment and handling requirements for bituminous-coated steel structural plate pipe and pipe arches under Section 709 when handling bituminous-treated walls. Repair broken or damaged bituminous coating at Contractor expense.